two other communications the same writer discusses the New Zealand earthworms, describing three new species, under as many generic heads. Prof. Dendy and Miss Olliver jointly describe a new freshwater leech of the genus Glossiphonia, while the former contributes a fourth paper on the land planarians of the colony.

THE acclimatisation and variation of Salmonidæ in New Zealand form the subject of a paper in the *Transactions* of the New Zealand Institute for 1900 by Mr. A. J. Rutherfurd, in which it is concluded that greater success is likely to attend the introduction of the north Pacific salmonoids than that of *Salmo salar*, which is a more delicate fish, unlikely to find what it requires in an ocean so far removed from its native habitat. In regard to trout, the author is of opinion that "whatever variety we liberate of the ordinary species of trout, it will develop into a *Salmo novae-zealandiae*, suited to the water in which it is liberated, and corresponding with trout in similar localities in the Northern Hemisphere more closely than with the varieties found in the more northern latitudes of our mother-country." Considerable interest also attaches to a paper by Mr. T. White on breeding black merinoes, of which there are now several flocks in the colony. Although the wool does not fetch so high a price as the best selected white it is really more valuable, as the price is the same for the whole fleece.

A CIRCULAR which we have just received from Messrs. Hirschberg and Oestergaard, Berlin, provides us with another example of German enterprise. This firm has produced a large wall map of the British Isles and of the world, showing the British colonies in a distinctive colour, and special offers are being made to English newspapers to take up the map and sell it to their readers. The map is 53 in. by 42 and is printed in twelve colours. In a space left at the top the title of the newspaper adopting the map, and other particulars of local interest, will be inserted as desired. As a number of newspapers have taken up the map there is apparently no objection to its German origin. But how is it that our geographical publishers cannot make similar arrangements with newspapers, and so prevent, in a sense, the war from being carried into our own country? It certainly seems strange that Germany should find it worth while to supply us with cheap maps of the British Isles and the Empire.

THE "Year Book of the Scientific and Learned Societies" (London: C. Griffin and Co., Ltd.) is a very handy guide to organisations existing in the British Isles for the promotion of knowledge. The societies and other institutions are arranged in fourteen different departments, according to their objects, and particulars are given as to officers, meetings, conditions of membership, and publications of each. In addition, lists are given of papers read before each society from January, 1900, to June of the present year. The reason why the papers read during eighteen months are catalogued instead of those read in a calendar year is that it is intended in future to make the Year Book correspond as closely as possible with the sessional year of the societies dealt with in it. Subsequent volumes will therefore record the papers read before each society between September and June, and they will be published as early as possible in the succeeding session. This change will be an additional convenience to those who use the Year Book as a manual of ready reference or a general review of Great Britain's annual contributions to scientific knowledge.

THE work of John Mayow, a pupil of Robert Boyle, was touched upon by Dr. J. B. Cohen, in an address recently delivered before the Yorkshire College Scientific Society. Mayow was certainly a genius, and some of his observations are remarkable for their shrewdness and depth, but they have often been misrepresented, and Dr. Cohen gives some interpretations of them which should interest students of the history of chemistry. His treatise on combustion was completed before the birth of the phlogiston theory, and was revived a century later, after Priestley had discovered oxygen, and the phlogiston theory was breaking down. Referring to Mayow's experiments on hydrogen and nitric oxide, Dr. Cohen remarks, "it must suffice to say that he anticipated Priestley in recognising both these as distinct kinds of gases, differing from, but possessing the same elasticity as air. Although Priestley's view of the composition of dephlogisticated air has much in common with that of Mayow's nitro-aërial particles, there is plenty of evidence to show that Priestley's ideas were formed quite independently. It must be admitted, however, that they show little advance on those of a whole century before."

THE recent work of M. Moissan on the properties of pure calcium has shown that the description of this element current in the text-books was by no means an accurate one, and from the work of M. Guntz, published in the current number of the *Comptes rendus*, it would appear that the properties of pure barium also differ considerably from those hitherto assigned to it. The starting point of the work is barium amalgam, and by the electrolysis of a saturated solution of barium chloride with a mercury kathode it would appear to be quite easy to prepare several kilograms of a 3 per cent. barium amalgam. It is the separation of the mercury from this amalgam which has proved to be such a difficult matter. M. Maquenne, for instance, who attempted to distil off the mercury, was quite unable to obtain a coherent ingot of barium in this way. M. Guntz has found that the secret of success in this experiment is to apply the heating gradually; the amalgam is placed in an iron boat in a wide porcelain tube and the tube heated by a coil of fine platinum wire, brasqued by a protecting coating of alumina and magnesia. By means of this electric furnace it has been found possible to raise the temperature as slowly as 200° C. per hour, and finally to maintain the tube, 50 mm. in diameter and 300 mm. long, at 1200° to 1300° C., with an expenditure of 600 to 700 watts. Working in this way a good yield of pure barium has been obtained at 1000° C. The barium thus obtained when freshly cut has a white silvery lustre; it is soft, a little harder than lead, and is extremely oxidisable in the air, often catching fire when attempting to remove it from the boat by means of a hard body. It resembles lithium and calcium in dissolving in liquid ammonia, and attacks easily water, alcohol and even an alcoholic solution of baryta.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Dr. A. E. Neale; two Short-eared Owls (*Asio brachyotus*), one Short-eared Owl (*Asio brachyotus*), European, presented respectively by Mr. W. Jamrach and Mr. C. W. Burnett; a Variegated Sheldrake (*Tadorna variegata*) from New Zealand, purchased.

OUR ASTRONOMICAL COLUMN.

THE NEW STAR IN PERSEUS.—Sir Norman Lockyer recently communicated to the Royal Society some further observations of the new star in Perseus made at the Solar Physics Observatory in continuation of the last previously recorded (Roy. Soc. *Proc.*, vol. lxviii. p. 399). In the present paper, which brings the information up to the end of September, it is first pointed out that the short period light variations have ceased and that the Nova was gradually becoming fainter, reaching about magnitude 6·7. In the visual spectrum the nebular line at wave-length 5007 was the strongest. Photographs of the spectrum showed that since last April a great change has taken place. The lines then were very broad and ill defined, but are now much narrower with better defined edges. The lines of hydrogen, which were the strongest in the spectrum have become comparatively very

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weak. Other lines have made their appearance, the strongest of which are 3868 and 3970, 4364 and 4720. The first is an unknown line strong in the spectra of planetary nebulæ, while the other three are of unknown origin. It is suggested that the second line (3970λ) is not the line of hydrogen at Hϵ, as the other hydrogen lines in the spectrum are so weak. There is, further, a new line in the ultra-violet at wave-length 342 (about), which Gothard has independently recorded. It is interesting to note that the new gas lines show a structure somewhat similar to that of the hydrogen lines in earlier photographs. The enhanced lines of iron, magnesium, &c., which were such a conspicuous feature of the first photographs, have entirely disappeared, and the probability is that the bright lines now, other than hydrogen and helium, belong to gases the terrestrial equivalents of which have not been found.

VARIATION OF LATITUDE.—Prof. S. C. Chandler has made an exhaustive examination of the old records obtained with the reflex zenith tube at Greenwich from 1852–82, which were abandoned as being affected with undiscoverable sources of instrumental error, and finds that for the periods providing continuous measures throughout the year they yield most valuable data for the determination of latitude variation, and that this anomaly, unknown at the time, was most probably the cause of the want of agreement among the observations. The two periods yielding continuous values were 1857–63 and 1864–70 (*Astronomical Journal*, vol. xxii., No. 511.)

DETERMINATION OF THE ELEVATION OF METEORS.—During the rather brilliant display of Perseids in August last a series of successful experiments was made by the observers at Juvisy Observatory to determine the heights of as many meteors as possible. Two stations, Juvisy and Croix-de-Berny (Antony), were chosen at a distance of 9·200 km. The number of meteors registered at both stations was 21, of which 8 fulfilled all the necessary conditions for the determination, and a table is given showing their calculated heights of appearance and disappearance, and also the resulting length of trajectory. The lowest record is 15 km. and the highest 119 km. (*Bulletin de la Société Astronomique de France*, November 1901.)

MERIDIAN OBSERVATIONS AT HARVARD COLLEGE OBSERVATORY.—In a separately published portion of vol. xli. of the *Annals of Harvard College Observatory* (No. 7, pp. 189–211) Mr. A. Searle gives an account of a series of special investigations which have been in progress with the hope of eliminating several systematic errors in the transit observations. It was thought that these might be due to the employment of ruled glass plates instead of spider threads, and for a time the latter have been substituted for trial. The result showed that the change produced no important difference in the discrepancies referred to. Personal equation with respect to magnitude was noticeable in both right ascension and declination when the transits were taken over inclined lines, as was the case with the ruled glass plates formerly used.

LENGTH OF THE TERRESTRIAL DAY.—Mr. R. S. Woodward has been investigating the extent to which the secular cooling of the earth and the fall of meteoric dust may affect the length of the terrestrial day. Attention is first drawn to the conclusion of Laplace that the day has not changed appreciably owing to secular cooling during the past 2000 years, but this was on the assumption that the earth is in the last stages of cooling. This the present author thinks an unnecessary and doubtful restriction, and proceeds, using the other conditions identical with those of Laplace, to develop a method of determining the effect on the length of day of the cubical contraction of the earth during any portion of, or during the entire history of, the process of secular cooling.

It is suggested that, contrary to the views of Laplace, Fourier and Poisson, the dissipation of the internal heat of the earth is not controlled by the atmosphere and oceans, but escapes as if they did not exist.

The main conclusion is that in the entire history of secular cooling of the earth the day may be shortened from this cause by as much as 6 per cent. of its original length. With respect to a definite time variation, it is concluded that the length of the day will not change, or has not changed, as the case may be, by so much as half a second in the first ten million years after the initial epoch.

The concluding portion of the paper deals with the effect of accumulations of meteoric dust. The distribution is assumed as uniform over the surface. Taking Newton's estimate of the number of meteorites falling daily, it is calculated that at least a million million years would elapse before a change of a quarter of a second would be produced. The effect of secular cooling is thus considerably more than that of meteoric accumulations. (*Astronomical Journal*, vol. xxi, No. 502).

PHYSIOLOGY AT THE BRITISH ASSOCIATION.

THE Section of Physiology was presided over by Prof. McKendrick, F.R.S., and the place of meeting was Prof. McKendrick's laboratory at the University. Despite the near approach of the date of the fifth triennial International meeting of Physiologists held at Turin in September, the Section was well attended by working physiologists, and the audiences were often large. Profs. Schäfer and Sherrington were vice-presidents, and amongst others contributing to the meetings were Sir Michael Foster, Sir John Sanderson, Dr. Theodore Beer, Dr. Brodie, Miss F. Buchanan, Dr. Burch, Prof. Gotch, Dr. A. A. Gray, Dr. Edridge Green, Prof. Marcus Hartog, Dr. Kennedy, Dr. Myers, Dr. Noel Paton, Prof. Waymouth Reid, Dr. W. H. R. Rivers, Prof. W. H. Thompson, and Dr. J. A. Wanklyn.

The proceedings of the Section commenced with the president's address. Prof. McKendrick took for his theme the relation of physical and chemical structure as understood at present to our conception of the structure of living matter. The president commenced by pointing to the progress which had been made by physiology in the quarter of a century that had elapsed since the previous meeting at Glasgow. Physiology in its progress had proven itself a living and logical inductive science grappling successfully with its problems by help of the same laws that physics and chemistry apply to non-living matter and its phenomena. In this respect it contrasted strikingly with subjects, *e.g.* human anatomy, which had been closely associated with it formerly in educational curricula.

Physiology had in the last quarter of the century proved fruitful of discovery to an astonishing extent. Many of its discoveries were of high practical value to medicine as well as of theoretical value. It had struck deep into the soil, acquiring many new data of extreme accuracy and obtaining much profounder insight in the concatenations of the machinery of life. The phenomena of muscular contraction—that prime event in biodynamics,—the process of secretion by gland cells, the mutual synergy of organs as illustrated by internal secretion, the functional architecture of the nervous system, the mechanics of rejuvenescence of protoplasm by sexual recombination (fertilisation), all these branches of the physiological tree of knowledge had, under the cultivation of the last five and twenty years, grown vastly in extent and yielded blossom and invaluable fruit. Facts more accurate and theories more profound had drawn their science closer to the elder sister sciences of more exact measurement and at the same time had created, it must be admitted, a gap between it and subjects with which it had formerly been usually associated in teaching. It had widened the educational field and educational worth of physiology, releasing it from former restriction to narrower technical applications. Save in mathematics, knowledge cannot be absolute in any domain of natural science. Physiology shared with the sister sciences their birthright of problems that were, to speak in paradox, the more insoluble the further one progressed toward their solution.

The animal body—the human body—was a machine of high complexity, constituted of many interrelated parts, called organs, the "simple" tissues and the "compound" tissues. A number of its phenomena had indubitably received their lasting explanation; but the difficulty of examining the machinery of living matter while still in living action was extreme. The first step of the chemist's analysis was to kill the substance; yet his goal was analysis of matter still alive. A number of thoughtful physiologists had returned in recent years to study of the unit of physiological structure, the cell. For the study of the phenomena of life an object more suitable than the undifferentiated single independently living cell was in many cases a simple tissue composed of numbers of such cells associated and highly differentiated, but all differentiated in the same way one as another. Hence the tendency of the modern physiologist to examine the powers and reactions of the simple tissues rather than of unicellular organisms such as amœba. It must be admitted, however, that in spite of all their labour in many respects their knowledge had not yet reached far. For

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